

What is claimed is:

1        1. In a cam torque actuated phaser disposed between a first moving shaft and a second  
2            moving shaft, the phaser having a first end connected to the first moving shaft, and  
3            a second end connected to the second moving shaft; a housing connected to the  
4            first end and a rotor connected to the second end, the rotor forming at least one  
5            vane disposed within the housing and dividing the housing into an advance  
6            chamber and a retard chamber, the vane being limited by at least one physical stop  
7            caused by an inside surface of the housing; the phaser being coupled to at least one  
8            check valve; the phaser being further controlled by a feed back control loop having  
9            a control law, wherein an integrator accumulates a plurality of error signals  
10           resulting from the difference between a set point control signal and a feedback  
11           signal; the phaser further including a spool valve having a predetermined null  
12           position; a method involving the phaser comprising:

13           moving the spool valve just off the predetermined null position;

14           permitting control fluid to flow at a substantially slow rate; and

15           causing the vane to be positioned at a substantial distance away from the  
16           physical stops, thereby reducing noise caused by the vane coming in  
17           contact with the housing.

1        2. The method of claim 1 further comprising the step of opening the loop.

1        3. The method of claim 1, wherein the spool valve is center mounted within the phaser.

1        4. The method of claim 1, wherein the step of moving the spool valve just off the  
2           predetermined null position includes moving the spool valve toward a retard  
3           direction or an advance direction.

1        5. The method of claim 1, wherein the predetermined null position is determined by a  
2           controller.

1        6. The method of claim 1, wherein the engine controller is an ECU.